REMARKS/ARGUMENTS

This is in full and timely response to the Office Action mailed February 20, 2003. Claims 1 and 4 were amended, and claim 2 was cancelled without prejudice or disclaimer to its underlying subject matter. Claim 1 was amended to incorporate the elements of claim 2, to recite that an amount of Co in said first electrolyte layer is 0 or 80 % less than an amount of Co in said second electrolyte layer; and to recite that a thickness of said second electrolyte layer is larger than a thickness of said first electrolyte layer. Support for this amendment can be found variously throughout the specification, for example, original claim 2, at page 6, lines 12-29, and at page 10, lines 10-15. Claim 1 was also amended to incorporate the elements of claim 2, and was further amended to recite that Ln is lanthanide rare earth metals. Support for this amendment can be found variously throughout the specification, for example, at page 5, lines 13-24. Claim 4 was amended to depend from claim 3, and to recite that an amount of Co in said first electrolyte layer is 0 or 80 % less than an amount of Co in said second electrolyte layer. Support for this amendment can be found variously throughout the specification, for example, at page 10, lines 10-15. No new matter was added. Claims 1 and 3-6 are pending in this application, with claim 1 being independent. By this Amendment, Applicants believe that all pending claims are in condition for allowance. Reexamination and reconsideration in light of the above amendments and the following remarks is respectfully requested.

Claim Objections

Claim 2 is objected to for use in the general formula (1) of "Ln," alleging that "Ln" is not an element of the Periodic Table. Applicants respectfully traverse this objection.

However, in order to expedite prosecution, and while not acknowledging the propriety of this objection, Applicants have incorporated the elements of claim 2 into claim 1, cancelled claim 2 without prejudice or disclaimer, and amended the claim element to recite that Ln is lanthanide rare earth metals. Withdrawal of this objection is respectfully requested.

Rejections under 35 U.S.C. §112

Claims 2 and 4-6 are rejected under 35 U.S.C. 112, second paragraph for indefiniteness. By this Amendment, the elements of claim 2 were incorporated into claim 1, and claim 2was cancelled without prejudice or disclaimer. Accordingly, this rejection will be address as pertaining to claims 1 and 4-6.

The Office Action alleges that the phrase "an amount of Co in said first electrolyte layer is 0 or 80% or less with respect to an amount of Co in said second electrolyte layer" in claims 2 and 4 are indefinite. By this Amendment, claims 1 and 4 were amended to recite that "an amount of Co in said first electrolyte layer is 0 or 80% less than an amount of Co in said second electrolyte layer." Support for this amendment may be found at least on page 10, lines 10-15 of the specification. This amendment clearly demonstrates that the amount of Co in the first electrolyte layer is either 0, or at least 80% less than the amount of Co in the second electrolyte layer. Withdrawal of this rejection is respectfully requested.

Claim 4 was further amended to depend from claim 3, resulting in proper antecedent basis for "lanthanum-gallate oxide." Withdrawal of this rejection is respectfully requested.

Rejections under 35 U.S.C. §102

Claims 1-6 are rejected under 35 U.S.C. 102(e) as anticipated by U.S. Patent No. 6,287,716 to Hashimoto et al. Applicants respectfully traverse this rejection. By this Amendment, the elements of claim 2 were incorporated into claim 1, and claim 2 was cancelled without prejudice or disclaimer. Accordingly, this rejection will be addressed as pertaining to claims 1 and 3-6.

Claim 1 recites a solid oxide fuel cell comprising an air electrode layer, a fuel electrode layer, and a solid electrolyte layer interposed between said air electrode layer and said fuel electrode layer, wherein said solid electrolyte layer comprises a first electrolyte layer which is made of a lanthanide-gallate oxide and has a first ionic transference number and a first total electric conductivity, and a second electrolyte layer which is made of a lanthanide-gallate oxide and has a second ionic transference number smaller than said first ionic transference number and a second total electric conductivity larger than said first total electric conductivity; said air electrode layer is laminated onto one side of said solid electrolyte layer; said fuel electrode layer is laminated onto the other side of said solid electrolyte layer; said first and second electrolyte

layers are made of a compound represented by general formula (1): $Ln_{1-a}A_aGa_{1-(b+c)}B_bCo_cO_3$, wherein Ln is lanthanide rare earth metals; wherein A is one or more kinds of Sr, Ca, and Ba; B is one or more kinds of Mg, Al, and In; a is in the range from 0.05 to 0.3; b is in the range from 0 to 0.3; c is in the range from 0 to 0.2; and (b+c) is in the range from 0.025 to 0.3; an amount of Co in said first electrolyte layer is 0 or 80 % less than an amount of Co in said second electrolyte layer; and a thickness of said second electrolyte layer is larger than a thickness of said first electrolyte layer.

One of the objectives of the present invention is to "provide a solid oxide fuel cell which has an improved efficiency achieved by a solid electrolyte layer having improved ionic conductivity, while maintaining the partition wall function." (pg. 4, lines 7-10). In order to effectively achieve this improved efficiency, it is necessary to prevent electrons, discharged in the fuel electrode by oxide ions reacting with the fuel, from returning into the air electrode layer through the solid electrolyte layer, and to catch these electrons securely in the fuel electrode. (pg. 3, lines 22-32). The present invention accomplishes this by dividing the aforementioned solid electrolyte layer into two layers, a first electrolyte layer 16a and a second electrolyte layer 16b, each having differing amount of Co. It is the composition and relational size of these two layers that represents the novelty of the present invention. As stated on page 10, lines 10-15 of the specification:

> [T]he amount of Co in the first electrolyte layer 16a is less than that in the second electrolyte layer 16b. The ionic transference number of the first electrolyte layer 16a is larger than that of the second electrolyte layer 16b. Moreover, the electric conductivity of the second electrolyte layer 16b is larger than that of the first electrolyte layer 16a.

By arranging first electrolyte layer 16a and second electrolyte 16b having the described compositions in this manner, electrons move in the solid electrolyte layer toward and into the fuel electrode layer and, once they are discharged in the fuel electrode by oxide ions reacting with the fuel, are prevented from returning into the air electrode layer. (pg. 6, lines 13-22). As a result, the efficiency of the solid oxide fuel cell is improved.

Hashimoto et al. '716 discloses a solid oxide fuel cell having a composition gradient between the electrode and the electrolyte. However, Hashimoto et al. '716 fail to teach, disclose

or suggest a need for preventing electrons, discharged in the fuel electrode, from returning into the air electrode; let alone a method for doing so. In fact, the levels of Co used in the solid electrolyte layer disclosed in Hashimoto et al. '716 are opposite from those recited in claim 1. As demonstrated in Hashimoto et al. '716 at Figs. 4A-4B and 6A-6B, the amount of Co present in each layer of the solid fuel cell gradually deceases from the air electrode layer to the electrolyte layer. In other words, the amount of Co present in the electrolyte layer is less than the amount present in the intermediate layer, and the amount of Co present in the intermediate layer is less than the amount present in the air electrode layer. As discussed above, this is opposite from the present invention. Hashimoto et al. '716, therefore, cannot anticipate the Co limitations recited for the first and second electrolyte layers of claim 1.

Stated differently, the solid oxide fuel cell of claim 1 has the following two structures:

Layer structures of claim 1		Layer structure of Hashimoto et al. '716
First layer structure	Second layer structure	Fuel electrode layer
Fuel electrode layer	Fuel electrode layer	Electrolyte layer
First electrolyte layer	Second electrolyte layer	(Co: small amount)
(Co: small amount)	(Co: large amount)	Intermediate layer
Second electrolyte layer	First electrolyte layer	(Co: intermediate amount)
(Co: large amount)	(Co: small amount)	Air electrode layer
Air electrode layer	Air electrode layer	(Co: large amount)

The Co amount gradually increases in the order of the electrolyte layer, the intermediate layer, and the air electrode layer in Hashimoto et al. '716. However, Co amount gradually decreases in the order of the second electrolyte layer and the first electrolyte layer in the solid oxide fuel cell having the second layer structure. However, in the solid oxide fuel cell having the first layer structure, which is similar to the solid oxide fuel cell of Hashimoto et al. '716, the Co amount gradually increases in the order of the first electrolyte layer and the second electrolyte layer. See also page 6, lines 12-26.

A document can only anticipate a claim if the document discloses, explicitly or implicitly, each and every feature recited in the claim. Verdegall Bros. v. Union Oil Co. of Calif., 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). Since Hashimoto et al. '716 fail to disclose, either explicitly or implicitly, teach or suggest at least the above-noted features recited in independent claim 1, Hashimoto et al. '716 cannot anticipate the claim. At least in view of the foregoing, claim 1is allowable, and the rejection should be reconsidered and withdrawn.

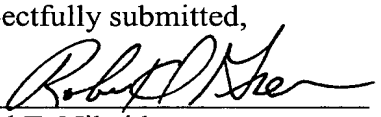
Dependent claims 3-6 depending from claim 1 are also allowable for the reasons above. Moreover, these claims are further distinguished by the materials recited therein, particularly within the claimed combination. Withdrawal of the §102(e) rejection is therefore respectfully solicited.

Conclusion

For the foregoing reasons, claims 1 and 3-6 are allowable, and the present application is in condition for allowance. Accordingly, favorable reexamination and reconsideration of the application in light of these amendments and remarks is courteously solicited. If the examiner has any comments or suggestions that would place this application in even better form, the Examiner is requested to telephone the undersigned attorney at the number below.

Dated: May 19, 2003

Respectfully submitted,

By 

David T. Nikaido
Registration No.: 22,663
Robert S. Green
Registration No.: 41,800
RADER, FISHMAN & GRAUER PLLC
1233 20th Street, N.W.
Suite 501
Washington, DC 20036
(202) 955-3750
Attorneys for Applicant

Should additional fees be necessary in connection with the filing of this paper, or if a petition for extension of time is required for timely acceptance of same, the Commissioner is hereby authorized to charge Deposit Account No. 180013 for any such fees; and applicant(s) hereby petition for any needed extension of time.